

ABSTRACT

The present invention provides an n -phase integrated buck converter. The converter comprises a controller and a plurality of circuits each operably connected to the controller. The controller controls the plurality of circuits to respectively output a plurality of current signals each having an associated phase and generate an output voltage signal. By applying the n phase concept of the invention, the amount of current each phase (i.e., each of the plurality of circuits) has to deliver is reduced. This directly reduces the conduction losses in each phase. Because the current in each phase is lower, a smaller MOSFET in each of the plurality of circuits may be used. The smaller MOSFET is easier to switch. Therefore, the switching losses per phase are also reduced. Reducing these losses will enable the invention to achieve high efficiencies. Integration allows all of the components to become physically closer and capable of being switched faster. Faster switching frequencies allow for smaller and less passive components. Integration also minimizes the total cost of the converter.